

# **INTEGRATED SUPPORT ENVIRONMENT (ISE) MAINTENANCE & OPERATIONS STATUS REPORT**

(Deliverable 0414)

**July 3, 1996**

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## **1. INTRODUCTION**

### **1.1. Identification of Document**

This is the Maintenance & Operations (M&O) status report for the Integrated Support Environment (ISE). The ISE is being established under the Infrastructure and Tool Development task order (Task 4B) of the Earth Observing System Data and Information System (EOSDIS) Independent Verification and Validation (IV&V) contract. The ISE provides the tools and infrastructure necessary for the performance of the EOSDIS IV&V contract.

### **1.2. Purpose and Scope of Document**

Even though the ISE is primarily comprised of Commercial Off-The-Shelf (COTS) products, the establishment of the ISE also includes developed tools and customizations of off-the-shelf Lotus Notes database applications. The purpose of this report is to detail, on a quarterly basis, ISE M&O status information associated with the network/computational infrastructure and developed tools. Information in the report will include but is not limited to:

- added COTS tools,
- COTS tool upgrades,
- COTS configuration and maintenance,
- database updates (i.e. ECS RTM/Oracle imports, ECS BONeS model updates)
- computing infrastructure improvements,
- developed/customized tool enhancements and releases,
- end user support and training, and
- infrastructure/utilization statistics.

### **1.3. Document Status and Schedule**

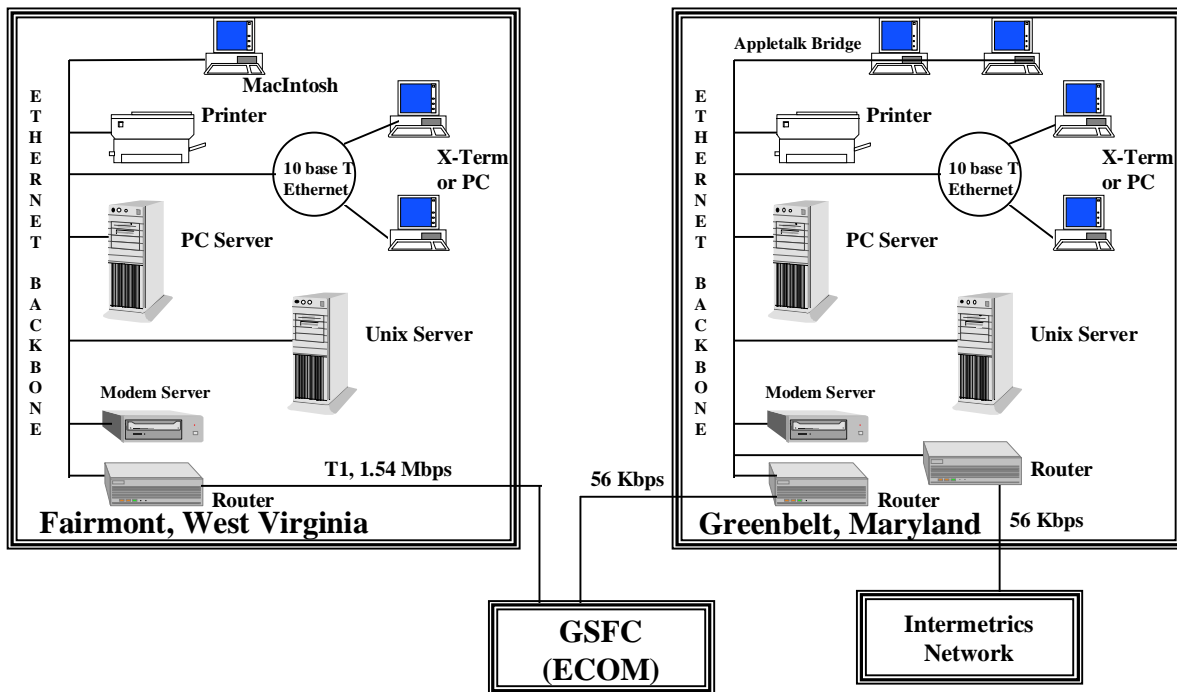
This ISE M&O Status Report, dated 3 July 1996, includes M&O status for the months of April, May, and June of 1996. The last quarterly report, for the months of January, February, and March 1996, was released on April 5, 1996.

## 2. Network/Computational Infrastructure Status

Network/computational infrastructure M&O status encompasses general system administration activities associated with the ISE. Section 2.1, Infrastructure Overview details the computing infrastructure which is maintained for the Greenbelt, MD and Fairmont, WV sites.

### 2.1. Infrastructure Overview

The ISE system architecture reflects a networked heterogeneous environment incorporating several COTS products and a few developed or customized applications. The planned ISE architecture has been detailed in the ISE System Architecture Document dated 30 January 1995. The documented architecture depicts an environment which is flexible and supportive for incrementally adding tools as new needs and requirements are levied against the ISE. Exhibit 2.1-1 reflects the network/computational infrastructure of the ISE. Note that the infrastructure depicted also serves as the computational infrastructure necessary to support ISE development.



**Exhibit 2.1-1 Network/Computational Infrastructure**

In addition to the network/computational infrastructure, a high level understanding of the development infrastructure can be garnered from Exhibit 2.1-2, ISE Development Infrastructure. This exhibit depicts many of the COTS tools which are a part of the ISE as well as the tools necessary to satisfy tool development undertakings.

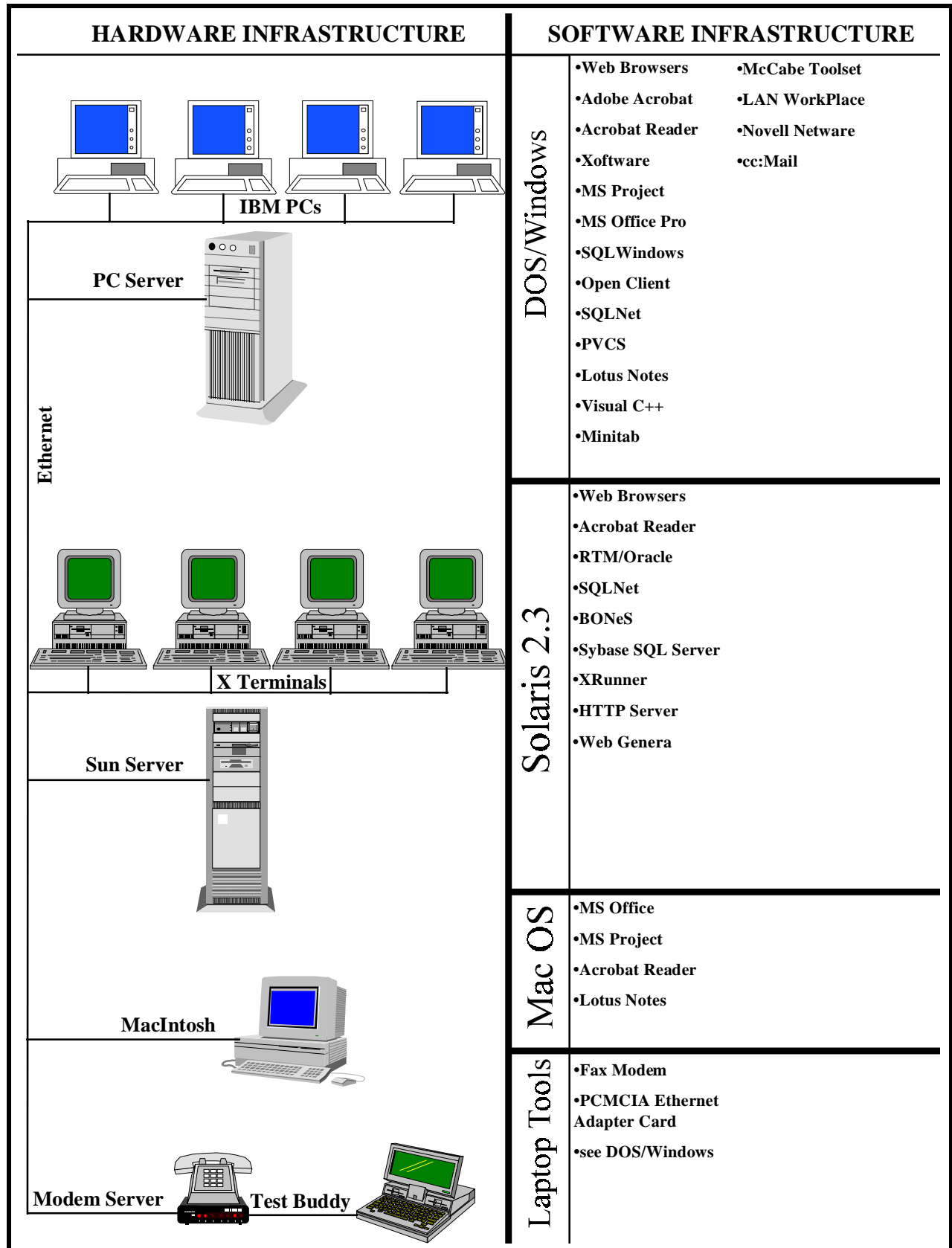


Exhibit 2.1-2 ISE Development Infrastructure



Table 2.1-1 delineates the number of PCs, laptops, MACs, X-Terminals, Suns, and printers which are currently configured and maintained as a part of the EOSDIS IV&V computing infrastructure in Greenbelt, MD and Fairmont, WV.

<b>Facility Location</b>	<b>PCs</b>	<b>Laptops</b>	<b>MACs</b>	<b>X-Terms</b>	<b>Suns</b>	<b>Printers</b>
Greenbelt, MD	45	5	5	7	2	4
Fairmont, WV	14	2	1	4	1	1
<b>TOTALS</b>	<b>59</b>	<b>7</b>	<b>6</b>	<b>11</b>	<b>3</b>	<b>5</b>

**Table 2.1-1 Facility Hardware Configurations**

For additional information concerning the ISE network/computational infrastructure and ISE Toolbox tools, refer to sections 5.2.1 and 5.2.2 of the ISE System Architecture Document dated 30 January 1995.

## **2.2. System Administration Status**

System administration activities for the current period were highlighted by the upgrade to Solaris 2.4 on the WV Sun SPARCserver. This upgrade was performed in preparation for upgrading to Sybase System 11 and RTM version 3.x. The following bulleted items provides an overview of system administration activities performed during this status reporting period:

### **General System Administration**

- Performed monthly, weekly, and daily backups of SPARC Servers and the PC file servers.
- Performed monthly cc:Mail maintenance.
- Provided daily support for software and hardware problems/needs.

### **Hardware/Software Configuration Administration**

- Recabled Greenbelt network wiring into a rack to simplify maintenance and troubleshooting.
- Installed latest Novell patches as a part of NetWare server maintenance.
- Performed additional OpenClient and SQLNet installations enabling access to Sybase and RTM/Oracle.
- Began setup and configuration of the new WV NetWare server.
- Installed new 4.2GB disk on SPARCserver 1000. Frees space on EOSDIS IV&V disk packs.

### **Database Administration**

- Installed new ECS RTM/Oracle requirement database versions (4/12/96, 5/3/96, and 6/12/96) ) received from HAIS.
- Performed Sybase upgrade from Release 10.0.0 to Release 10.1.0.
- Repartitioned Sun SPARC 1000 disks to accommodate Sybase devices for data, logs, etc...

### **2.3. COTS Evaluation/Procurement Status**

In support of EOSDIS IV&V analysis and tooling efforts, COTS product evaluations are performed to determine the best alternative for fulfilling an EOSDIS IV&V need. During the current reporting period, an evaluation of the Checkpoint PC cost estimation tool was performed to determine feasibility of sharing the tool capabilities between geographically dispersed individuals. Basically, the Checkpoint cost estimation tool is LAN limited. An additional copy should be procured and placed in a common work environment for users to utilize.

An upgrade of the Sybase SQL Server RDBMS from a 16 concurrent user license to a 32 concurrent user license was procured during this reporting period. This was needed due to increased usage of the Task 4B developed client/server tools (e.g. ARDB, PITS, and TMDB). Refer to section 6 for client/server tool utilization information.

### **3. Development Item Status**

In order to fulfill specific IV&V tooling needs that could not be adequately addressed by available COTS products, development initiatives were undertaken. ISE tool development initiatives include the following:

- **Data Management Database (DMDb)**  
This is a Lotus Notes application targeted to support management and tracking of Government Furnished Equipment (GFE).
- **Project Issue Tracking System (PITS)**  
This application is being implemented using the SQLWindows client/server development tool. Release 2.6 is currently deployed at GSFC and the Intermetrics Greenbelt, MD and Fairmont, WV locations. The PITS is a client/server application targeted to support the management, dissemination, and tracking of EOSDIS IV&V issues and Review Item Discrepancies (RIDs). PITS data is stored in a Sybase SQL Server RDBMS.
- **Automated Requirements Database (ARDB)**  
This application is being implemented using the SQLWindows client/server development tool. Release 7.0f is currently deployed at GSFC and the Intermetrics Greenbelt, MD and Fairmont, WV locations. This application primarily serves as a repository of requirement analysis results. It interfaces with RTM/Oracle and a Sybase RDBMS.
- **Interface Analysis Database (IADB)**  
The current version of this application is in Microsoft Access. The IADB primarily supports interface analysis activities by providing database consistency, completeness, and reporting functionality.
- **EOSDIS IV&V homepage**  
This application is implemented in HTML and shell scripts which are accessible to World Wide Web (WWW) browsers. This application is used to disseminate information about the EOSDIS IV&V effort inclusive of deliverables, contacts, etc.
- **ECS Ground System (EGS) Integration and Test homepage**  
This application is implemented in HTML and shell scripts which are accessible to World Wide Web (WWW) browsers. This application is used to disseminate information about the EGS I&T effort inclusive of deliverables, contacts, etc.
- **Test Management Database (TMDB)**  
This application is being implemented using the SQLWindows client/server development tool. Release 3.0 is currently deployed in both Greenbelt, MD and Fairmont, WV. This application was utilized to store and track ECS Component Acceptance Test thread, test case, test procedure and test result information. It is now being utilized to maintain EOS Ground System (EGS) Integration and Test (I&T) planning information in support of Version 1 testing.

For additional information about functionality provided by each tool, refer to the ISE Element User's Guide dated 31 May 1996. The following subsections detail tooling status for this reporting period.

### **3.1. Data Management Database (DMDB) Status**

This Lotus Notes application was deployed in January 1995. No modifications or enhancements were made to the DMDB during this reporting period:

### **3.2. Project Issue Tracking System (PITS) Status**

The initial release of this application was deployed in the Intermetrics Greenbelt office in January 1996. During the current reporting period, additional end-user training was provided so that users could take full advantage of database query, reporting, and workflow messaging functionality. Major functionality incorporated during this reporting period includes:

- Added the capability to print Review Item Discrepancies (RIDs).
- Added functionality to support Interface Control Working Group (ICWG) issue tracking needs.
- Added two issue summary report formats, PITS Issue Summary and ICWG Issue Summary.
- Added Issue Sponsor metadata item to TIM form, query form, and associated combo boxes.
- Incorporated maintenance functionality to automatically create all the metadata value lists for added repositories. In other words, when you add a new repository (e.g. like ESDIS-ICWG) you are permitted to define different metadata item (e.g. Category) values for data entry for that repository.
- Changed code so that the TIM form DATE field is now updated to current date when a state transition is recognized (DRAFT --> OPEN, etc...). You may still edit the date when entering old information.
- Added a MESSAGE LOG folder has been into WORKFLOW MESSAGING.

### **3.3. Automated Requirements Database (ARDB) Status**

The initial release of the ARDB client/server tool was deployed on 6 October 1995 to accommodate the IR-1 requirements analysis activity. Currently, release 7.0f is deployed at GSFC and at both EOSDIS IV&V locations. Incremental enhancements incorporated during this reporting period includes the following:

- Initiated development of new ARDB metrics page. Commonly executed SQL statements have been pre-canned for incorporation into the ARDB.
- Moved the graphics server startup to print dialogs so that this processing is not performed unless some print action is to be taken.

### **3.4. Interface Analysis Database (IADB) Status**

The initial release of the IADB Microsoft Access application was deployed in December of 1994. Since that time several enhancements and modifications have been incorporated to support on-

going Interface Analysis (Task 9) activities. However, no modifications or enhancements were incorporated during this reporting period.

### **3.5. Homepage Development Status**

#### **3.5.1. EOSDIS IV&V Homepage Status**

The EOSDIS IV&V Homepage was developed using Hyper Text Markup Language (HTML) and published via a HTTP server which resides on the Fairmont Sun Sparcserver 1000. The original intent of the page was to disseminate EOSDIS IV&V deliverable information via the WWW. The initial EOSDIS IV&V Homepage was deployed for public access in March 1995. Since that time, the majority of EOSDIS IV&V deliverables have been made available via the page and personnel contact information has also been published.

During this reporting period, a PITS World Wide Web (WWW) browser capability was incorporated as a part of the EOSDIS IV&V Homepage. This capability allows GSFC personnel to access PITS data stored in Sybase through a WWW browser such as Netscape. The PITS WWW browser will be expanded to include query and reporting functionality similar to that in the PITS client/server application. The Universal Resource Locator (URL) for the EOSDIS IV&V Homepage is "<http://fairmont.ivv.nasa.gov/ivv>".

#### **3.5.2. EOS Ground System (EGS) I&T Homepage Status**

The EOS Ground System I&T Homepage was released on 1 November 1995. Like the EOSDIS IV&V Homepage, this homepage is being developed using Hyper Text Markup Language (HTML) and will be published via a HTTP server which resides on the Fairmont Sun Sparcserver 1000.

During this reporting period, several library categories were added to the EGS I&T Homepage library and project schedule information was made available for download. No additional changes are anticipated for the next reporting period. The Universal Resource Locator (URL) for the EGS I&T Homepage is "<http://fairmont.ivv.nasa.gov/it>".

### **3.6. Test Management Database (TMDB) Status**

The TMDB client/server application was developed to support testing efforts performed by either the EOSDIS IV&V or EGS I&T teams. The first official release of the TMDB application was delivered on 30 August 1995. Release 3.0 was deployed on 15 April 1996. During this reporting period, functionality/enhancements to the TMDB include:

- Added metrics reporting capabilities inclusive of thread, test case, and requirements metrics by test program, release, and fidelity of requirement mapping.
- Completed the addition of printing capabilities for test procedure and test metrics.
- Ported RTM traceability information with records having "current" status to Sybase for TMDB utilization during traceability query execution. This will enable the derivation of Level 3 test metrics based upon Requirement -By-Release test metrics.

### **3.7. RTM Differencing Utility (RDU) Status**

The RTM Differencing Utility (RDU) is a newly prototyped tool which assists IV&V analysts in determining differences between RTM baselines. The initial capability assists analysts in identifying added, deleted, and updated RTM records. The first official release, version 1.0, of the RDU application was delivered on 31 May 1996. Several ideas are under consideration for expanding RDU capabilities. No expansion is planned until after RTM is upgraded to version 3.x. Version 3.0 of RTM includes Oracle schema changes which will impact the ARDB and RDU. An upgrade to RTM version 3.x is planned for July 1996.

#### **4. Deliverable Status**

During this reporting period, the following Task 4 deliverables were distributed for review:

- ISE M&O Status Report due 5 April 1996
- ISE Evaluation and Planning TAM due 1 May 1996
- ISE Element Users Guide - Update due 31 May 1996
- ISE Software Code due 14 June 1996
- ISE Element Version Description due 14 June 1996
- ISE Release 2 Demonstration due 14 June 1996

Deliverables scheduled for distribution during the next reporting include:

- ISE M&O Status Report due 5 July 1996
- ISE Infrastructure Metrics Report for July due 9 August 1996
- ISE Infrastructure Metrics Report for August due 13 September 1996

## **5. End-User Support and Training**

The following bulleted list highlights support and training items addressed during this reporting period.

- Performed homepage data entry to publish EOSDIS IV&V deliverables on the EOSDIS IV&V and EGS I&T homepages.
- Provided informal training to Greenbelt IV&V personnel in the use of Version 3.0 of the TMDB.
- Provided informal training to GSFC and IV&V personnel in the use of Version 7.0f of the ARDB.
- Provided informal training to Greenbelt IV&V personnel in the use of Version 2.6 of the PITS.

Informal training planned for the next reporting period includes TMDB reorientation training for version 3.1. This will be performed so that full advantage can be taken of incorporated metrics capabilities.



## 6. Infrastructure/Utilization Metrics

With the exception of the EOSDIS IV&V Homepage, the primary users of the ISE has been the EOSDIS IV&V personnel located in Fairmont, WV and Greenbelt, MD. Table 6-1 reflects ISE utilization information associated with both the infrastructure and developed tools. With the exception of the WWW homepages, the metrics reported corresponds to the approximate average number of users for each month of this reporting period.

IV&V Resource	Users (Avg./Month)	
Greenbelt LAN (EOSDIS IV&V)	44	
Fairmont LAN (EOSDIS IV&V)	11	
Data Management Database	2	
Project Issue Tracking System (PITS)	23	
Automated Requirements Database (ARDB)	5	
Interface Analysis Database	7	
EOSDIS IV&V Homepage (accesses)	15,232 (TOTAL)	
Homepage Areas:	IV&V (5655)	TAM (80)
April 1996	1254	18
May 1996	2174	45
June 1996	2227	17
EGS I&T Homepage (accesses)	2,456 (TOTAL)	
April 1996	263	
May 1996	620	
June 1996	331	
Test Management Database	6	
McCabe Toolset	1	
Requirement Traceability Management (RTM)	11	
Block Oriented Network Simulator (BONeS)	2	
XRunner	5	
Sybase SQL Server (via ARDB, PITS, & TMDB)	34	

**Table 6-1 ISE User Metrics**

Table 6-2 highlights some cumulative totals for information maintained in the Sybase SQL Server repository. Note that the cumulative totals do not account for data delivered prior to deployment of the client/server tools.

Client/Server Tool	Repository Metrics (Totals)
Test Management Database (TMDB)	
Functional Test Threads	46
Test Cases	141
Automated Requirements Database (ARDB)	
Requirements Analysis Issues	836
Project Issue Tracking System (PITS)	
EOSDIS IV&V TIMs	143
ESDIS ICWG TIMs	83

**Table 6-2 ISE Tool/Repository Metrics**

## **7. Acronyms and Abbreviations**

Below is a list of the abbreviations and acronyms used in this document.

ARDB	-	Automated Requirements Database
BONeS	-	Block Oriented Network Simulator
CDR	-	Critical Design Review
COTS	-	Commercial Off-The-Shelf
CSC	-	Computer Science Corporation
DMDB	-	Data Management Database
ECS	-	EOSDIS Core System
EGS	-	EOS Ground System
EOSDIS	-	Earth Observing System Data Information System
GFE	-	Government Furnished Equipment
GSFC	-	Goddard Space Flight Center
GUI	-	Graphic User Interface
HTML	-	Hyper Text Markup Language
IADB	-	Interface Analysis Database
IDHS	-	Issue/Discrepancy Handling System
IDR	-	Interim Design Review
ISE	-	Integrated Support Environment
IV&V	-	Independent Verification and Validation
I&T	-	Integration and Test
LAN	-	Local Area Network
MAC	-	Macintosh
MD	-	Maryland
M&O	-	Maintenance and Operations
NASA	-	National Aeronautics And Space Administration
PC	-	Personal Computer
PITS	-	Project Issue Tracking System
RAM	-	Random Access Memory
RBR	-	Requirement By Release
RDBMS	-	Relational Data Base Management System
RDU	-	RTM Differencing Utility
RID	-	Review Item Discrepancy
RTM	-	Requirements Traceability Management
SCDO	-	Science and Communications Development Office
SEPG	-	Systems Engineering Process Group
SI&T	-	System Integration and Test
TMDB	-	Test Management Database
WAN	-	Wide Area Network
WV	-	West Virginia
WVU	-	West Virginia University
WWW	-	World Wide Web